

7.0 SUMMARY

This report presents the results of a screening level risk assessment for human health associated with exposure of persistent organic pollutants. The report is part of the *Regional Capacity Building Program for Health Risk Management of Persistent Organic Pollutants (POPs) in South East Asia* (POPs Project). The risk assessment has been performed on a case study site, the MEA Case Study Site, Bangkok, Thailand. In support of the capacity building program and the present risk assessment, the following major activities were performed:

1. A Launch Workshop in Luang Prabang, Lao PDR between April 3rd and April 6th 2008.
2. Selection by the National Focal Point in consultation with the MEA site as the POPs case study site in late May 2008. The site selection was based on speculative concern for (i) potential PCB contaminated oils which may have been inadvertently deposited in site soils, and (ii) the proximity of residential developments adjacent to the site.
3. Technical seminar and environmental sample collection at the MEA site from July 27th to August 2nd 2008:
 - **A Stakeholders Meeting:** National Focal Points, Senior Management of Key Government Agencies, and National Consultants to discuss the POPs project, including the training program and stakeholder identification and the goal of the field program;
 - **A Training Seminar** on sample collection, sample handling and analysis followed by the hands-on demonstration at the study sites for the government officials;
 - **A Site Reconnaissance:** to select and map potential sampling locations, to discuss the sampling plan and to liaise with local stakeholders (site management and local community members);
 - **Fieldwork:** to collect environmental and biological samples with the support of the national consultant;
 - **Fieldwork Demobilization:** to (a) prepare samples for shipping (i.e., sample labeling, storage, shipping and the completion of export formalities), (b) complete and archive important documents (i.e., chain of custody forms, survey and field forms, and (c) properly clean/decontaminate and store field equipment; and
4. Chemical analyses of environmental samples was subsequently provided by Hiyoshi on October 4th, 2008 and Axys on January 13th, 2009.

5. Completion by Hatfield of initial draft screening human health risk assessment was presented and discussed at the POPs Toolkit consultation/training meeting on December 17th, 2008, and further rounds of consultation/collaboration with the National Focal Point and National Consultants thereafter, to incorporate site-specific information on various exposure assumptions and site practices.
6. Provision of a National Training Workshop (January 26th to 27th, 2009) given by Hatfield and WB, with specific discussion of the present MEA case study.

Key results from the risk assessment of MEA case study are:

Problem Formulation

- The problem formulation indicated that all the components required for a human health risk were present: chemical hazards, receptors and pathways linking the hazards and receptors.
- The chemical hazards identified were PCBs and PCDD/PCDFs. The receptors identified at the site were both ecological receptors (fish, crabs and snails) and humans (workers and residents of local homes).
- Exposure pathways identified were split into onsite exposures, and exposures related to off-site migration of contaminants via wind erosion or surface water run-off.

Exposure Assessment

- The exposure assessment used a computer-based model to estimate the total daily exposure of people (workers and local residents) to PCB + PCDD/PCDF TEQs. The model indicated that ingestion of contaminated food (e.g., fish) is likely the predominant route of exposure for PCBs and PCDD/PCDFs.

Hazard Assessment

- For the Hazard Assessment, toxicity reference values (TRVs) were selected in order to calculate a numerical expression of potential human health risk. The chemicals of potential concern (PCB + PCDD/PCDF TEQs) were treated both as carcinogens and non-carcinogens.

Risk Characterization

- Results of the Risk Characterization indicated that there is a potential human health risk associated with exposure to PCBs & PCDD/PCDFs, primarily due to the consumption of fish tissue.
- The potential risk was placed into the context of uncertainties and assumptions made during the risk assessment. Two options were

discussed: (1) conducting a refined (more detailed) risk assessment in an attempt to determine if potential risks are actually negligible or absent; or, (2) conduct risk management activities at the site to mitigate potential risks.

The national participants of the National Training Workshop which took place in Hue Hin from January 26th - 27th, 2009 also assessed potential risk management measures that could be applied to reduce the exposure and related human health risks to workers, and local residents. A short list of possible measures was created. Recommended measures included:

- Develop and enforce an occupational health and safety plan;
- Monitor and verify effectiveness of mitigation strategies;
- Risk Communication and Training; and
- Measures for controlling PCB Hazards and controlling off-site Transport of Contaminants - i) Excavate contaminated soils and store this material in a secure storage building in clearly labeled barrels or cap contaminated soils with pavement where excavation is not practical; and ii) Prevent soils from being washed off site with surface water run off. One option is to install catch basins along the inside of the property at drainage pipes. Catch basins should be cleaned out regularly. Collected sediments should be stored on site in a responsible manner.